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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/814,995

03/31/2004

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EXAMINER

YANG, NELSON C

ART UNIT

PAPER NUMBER

1641

MAIL DATE

DELIVERY MODE

12/12/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/814,995	<b>Applicant(s)</b> SPENCER ET AL.	
	<b>Examiner</b> Nelson Yang	<b>Art Unit</b> 1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 February 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 5,6,9 and 14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4,7,8,10-13 and 15-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                        |                                                                   |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2/4/08</u> .                                                  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 29, 2008 has been entered.

### ***Response to Amendment***

2. Applicant's amendment of claims 1, 13 is acknowledged and has been entered.
3. Claims 1-4, 7, 8, 10-13, 15-18 are currently under examination.
4. Claims 5, 6, 9, 14 are withdrawn.

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 2, 4, 11, 15-18 are rejected under 35 U.S.C. 102(a) and under 35 U.S.C. 102(e) as being anticipated by Jeon et al. [US 2002/0113095].

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With respect to claims 1, 13, Jeon et al. teach a method of preparing concentration gradients on a surface by exposing a substrate to a fluid along a portion of a surface under conditions of substantially laminar flow, wherein the fluid comprises a concentration gradient of a substance, wherein the gradient is substantially perpendicular to the direction of flow (para. 0011), wherein the substance may be chemical or biochemical and is deposited in a desired concentration gradient along the surface of the substrate (para. 0098), and would thus be an adsorbate. The substance may be deposited in a desired gradient increasing from left to right, while a second substance may be applied to the surface parabolically (para. 0098), which would result in a concentration of the substances decreasing from a first area to a second area of the substrate. Jeon et al. further disclose that flow speed of the composite stream may be adjusted in order to alter the position along the stream where a particular concentration gradient is realized (para. 0076), which is dependent on the absorption kinetics of the adsorbates.

7. With respect to claim 2, Jeon et al. teach that a first substance may be deposited in a desired gradient increasing from left to right, while a second substance may be applied to the surface parabolically (para. 0098), both which would adsorbates as they are deposited on the substrate.

8. With respect to claim 4, Jeon et al. teach substrates comprising glass (para. 0066).

9. With respect to claim 11, Jeon et al. teach that the fluid may be provided at an adequate flux, pressure and velocity using syringe pumps (para. 0050).

10. With respect to claims 15, 16, Jeon et al. teach a method of preparing concentration gradients on a surface by exposing a substrate to a fluid along a portion of a surface under conditions of substantially laminar flow, wherein the fluid comprises a concentration gradient of

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a substance, wherein the gradient is substantially perpendicular to the direction of flow (para. 0011), wherein the substance may be chemical or biochemical and is deposited in a desired concentration gradient along the surface of the substrate (para. 0098), and would thus be an adsorbate. The substance may be deposited in a desired gradient increasing from left to right, while a second substance may be applied to the surface parabolically (para. 0098), which would result in a concentration of a first substance decreasing from a first area to a second area of the substrate, and a second substance increasing from one area to a second area, wherein the surface gradient of the second substance would be radially symmetrical due to its parabolic shape.

11. With respect to claim 17, Jeon et al. teach that a first substance may be deposited in a desired gradient increasing from left to right (para. 0098).

12. With respect to claim 18, Jeon et al. teach that the substrate comprises a microfluidic network (para. 0035), and therefore the surface gradient would be suitable for analysis involving microfluidics.

### ***Claim Rejections - 35 USC § 103***

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

14. Claims 3, 7, 8, 12, are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeon et al. [US 2002/0113095] in view of Genzer et al. [US 6,770,323].

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With respect to claims 3, 7, 8, Jeon et al. teach a gradient as discussed above, but fail to teach a hydrophobicity gradient that changes the amount of water attracted to the surface over the length of the surface of the substrate.

Genzer et al., however, teach that patterned substrates may be used as detection targets, and that one can produce a complex gradient that changes from hydrophobic to hydrophilic in one direction and cationic to anionic in the other direction, such that a complex biomolecules will choose an optimum combination of hydrophobic/cationic forces, and one can conveniently measure the adsorption properties of complex molecular species (column 14, lines 54-65).

Genzer et al. further teach that these gradients may be created using a silicon oxide covered wafers (column 15, lines 34-40) or PDMS substrates, which are hydrophobic substrates (column 5, lines 10-20), and coating the substrates with polyelectrolyte solutions, such as oligonucleotides (column 8, lines 5-15).

Therefore, one of ordinary skill in the art at the time of the invention would have been motivated to have patterned substrates with a complex gradient that changes from hydrophobic to hydrophilic in one direction and cationic to anionic in the other direction, such that a person of ordinary skill in the art would be able to conveniently measure the adsorption properties of complex molecular species.

15. With respect to claim 12, Genzer et al. disclose dipping the substrate in a liquid bath (column 14, lines 36-41), which would involve full immersion of the substrate. This would allow for a more rapid, efficient and complete means of producing surface gradients on the substrates of Jeon et al.

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16. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jeon et al. [US 2002/0113095] in view of Natan et al [US 6,242,264 B1].

The teachings of Natan have been disclosed above, but they fail to teach that the substrate is exposed to the first solution using a linear-motion drive.

Natan et al., however, teaches the step of using a motorized translation stage to immerse a substrate for producing a gradient coating thereon, in order to immerse the substrate at a fixed rate that produces known, repeatable immersion conditions. See column 40, lines 49-64.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to apply Natan's step of using a motorized translation stage to immerse the substrate of Jeon et al., in order to immerse the substrate at a fixed rate that produces known, repeatable immersion conditions. The benefit of being able to fabricate gradient substrates with consistent results provides the motivation to combine Natan's step with substrate of Jeon et al.. In addition, one of ordinary skill in the art at the time of the invention would have had a reasonable expectation of success in including Natan's step in the method of Jeon et al., as both Jeon et al. and Natan et al. teach substrates with surface gradients.

### ***Response to Arguments***

17. Applicant's arguments with respect to claims 1-4, 7-8, 10-13, 15-18 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

18. No claims are allowed.

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19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nelson Yang whose telephone number is (571)272-0826. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Shibuya can be reached on (571)272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

20. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nelson Yang/  
Primary Examiner, Art Unit 1641